CLAIMS

What is claimed is:

1. A semiconductor package with a heat sink, comprising:

a substrate having at least one opening penetrating therethrough;

a heat sink having a first surface and a corresponding second surface, wherein a thermally conductive adhesive is applied on the first surface of the heat sink, via which the heat sink is attached to the substrate and covers one end of the opening of the substrate;

at least one semiconductor chip mounted on the substrate and over the other end of the opening via the thermally conductive adhesive, making the thermally conductive adhesive filling the opening interposed between the semiconductor chip and the heat sink;

a plurality of first conductive elements for electrically coupling the semiconductor chip to the substrate;

a molding compound for encapsulating the semiconductor chip, the plurality of first conductive elements, and a portion of the substrate; and

a plurality of second conductive elements implanted on a side of the substrate where the heat sink is attached, for electrically connecting the substrate to an external device.

2. The semiconductor package as recited in claim 1, wherein the semiconductor package is a Ball Grid Array (BGA) package.

3. The semiconductor package as recited in claim 1, wherein the heat sink is made of a material selected from the group consisting of copper, copper alloy, silver, silver alloy, and other thermally conductive materials.

4. The semiconductor package as recited in claim 1, wherein the heat sink is a metallic thin plate.

5. The semiconductor package as recited in claim 1, wherein black oxidation is performed on the first surface of the heat sink before applying the thermally conductive adhesive thereon, so as to enhance adhesion between the first surface and the thermally conductive adhesive.

6. The semiconductor package as recited in claim 1, wherein brown oxidation is performed on the first surface of the heat sink before applying the thermally conductive adhesive thereon, so as to enhance adhesion between the first surface and the thermally conductive adhesive.

7. The semiconductor package as recited in claim 1, wherein horizontal brown oxidation is performed on the first surface of the heat sink before applying the thermally conductive adhesive thereon, so as to enhance adhesion between the first surface and the thermally conductive adhesive.

8. The semiconductor package as recited in claim 1, wherein a protruding portion is formed on the first surface of the heat sink and protrudes into the opening of the substrate to shorten a heat dissipation path between the semiconductor chip and the heat sink.

9. The semiconductor package as recited in claim 1, wherein a plurality of spaced protruding portions are formed on the first surface of the heat sink and protrude into the opening of the substrate to shorten a heat dissipation path between the semiconductor chip and the heat sink and to increase surface area for heat dissipation.

10. The semiconductor package as recited in claim 1, wherein the thermally conductive adhesive comprises a uniform mixture of at least one type of organic vehicle, solvent, and metallic powder.

11. The semiconductor package as recited in claim 10, wherein the metallic powder is made of a material selected from the group consisting of copper, copper alloy, silver, silver alloy, and other thermally conductive metals.

12. The semiconductor package as recited in claim 1, wherein the first conductive elements are bonding wires.

13. The semiconductor package as recited in claim 12, wherein the bonding wires are connected to the semiconductor chip and the substrate by means of reverse wire-bonding.

14. The semiconductor package as recited in claim 1, wherein the second conductive elements are solder balls.

15. The semiconductor package as recited in claim 1, wherein a thickness of the heat sink is smaller than a height of the second conductive elements soldered to the substrate.

16. The semiconductor package as recited in claim 1, wherein the external device is a printed circuit board.